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Leading, composite and sentiment indicators, interim report

Guidelines on producing leading, composite and sentiment indicators – draft

Note by the Task Force on leading, composite and sentiment indicators

Summary

The document provides an extract of the draft *Guidelines on producing leading, composite and sentiment indicators*. The purpose of the Guidelines is to clarify the possible roles of NSOs in producing leading, composite and sentiment indicators, and to provide practical guidance on the production of these types of indicators.

The Guidelines are prepared by the Task Force on leading, composite and sentiment indicators, composed of Denmark (Chair), Hungary, Israel, Italy, Mexico, Netherlands, Turkey, Eurostat, Organisation for Economic Co-operation and Development and United Nations Statistics Division. Mr. J. Boschhouwer and Mr. G. Luigi Mazzi are members of the group as independent experts. Sweden chaired the Task Force until October 2017.

In October 2017, the CES Bureau reviewed the draft and requested the UNECE secretariat to send the document to all members of the CES for electronic consultation to gather input for finalising the Guidelines.

The current extract of the Guidelines is prepared for translation purposes. It includes selected parts of the Guidelines: (i) background; and (ii) the role of NSOs in producing leading, composite and sentiment indicators. The full text of the draft Guidelines has been sent to all members of the Conference for interim electronic consultation. It is available at: https://statswiki.unece.org/x/hoCmCg. The Secretariat will summarize the replies and inform the CES 2018 plenary session about the outcome of the consultation. Based on the comments received, the Task Force will continue to improve the draft Guidelines with the aim to submit the document to the CES 2019 plenary session for endorsement.

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I. Background

A. Leading, composite and sentiment indicators

1. Leading, composite and sentiment (LCS) indicators cover a broad and diverse group of statistical measures, which in different ways aim to provide information about the society and its individuals.

2. Leading indicators aim to anticipate the development of a reference series. Typically, leading indicators are constructed to predict the cycles of industrial production or gross domestic product (GDP), which are used as proxy measures for economic development. Composite indicators are constructed to measure more complex, or multidimensional phenomena by combining individual indicators into one single measure. Sentiment indicators are compiled to reflect the perceptions, attitudes or expectations of groups of respondents, e.g. different groups of individuals, households or businesses.

3. LCS indicators offer information on a range of topics that are not covered by what may be considered traditional official statistics, or which typically have not been covered by national statistical offices. Moreover, LCS Indicators may also provide information on complex issues in a relative simple or condensed form, which appeals to many users of statistics, including policy makers and the media, who increasingly refer to LCS indicators.

4. Over the previous decade there has been a growing demand for LCS indicators, which are becoming still more common in different areas, including business cycles analysis, measuring of well-being and sentiment indicators expressing the confidence of business in the economic development or that of households towards the future or their sense of happiness or safety. LCS indicators are also becoming more and more common for international comparisons to assess country performance, and are increasingly used for policy making.

5. The demand for LCS indicators has been driven by evolving user needs for indicators that are easier to compare, provide information in condensed form and shed light on areas traditionally not covered, or not covered very well, by most national statistical offices (NSOs). Some LCS can be compiled relatively quickly and hence give earlier indications of developments than can be found in traditional statistical series. The development is facilitated by the growing abundance of data, processing power and IT tools, which makes the production of LCS indicators much easier than in the past. Hence, many LCS indicators are produced by other data providers than the NSOs.

B. The role of NSOs in producing LCS indicators

6. LCS indicators are potentially an area where official statistics could engage for the benefit of all stakeholders. However, there are different practices among countries, as well as different views on the role of NSOs in the production of LCS indicators. Some NSOs consider LCS indicators out of scope of what they should produce, or do not see LCS indicators as a priority. Some NSOs also fear that engaging in the production of LCS may harm the credibility of the NSOs as the provider of official statistics.

7. Other NSOs have considerable experience in producing LCS indicators, or are considering the possibility to engage in the production of LCS indicators. NSOs can ensure that indicators are produced based on the principles of official statistics and by disseminating the indicators improve users' perception of the relevance and value of official statistics. It can also be argued that if statistical offices do not use their data and expertise to produce these indicators, they may be produced by other organisations not

adhering to the principles of official statistics. Such organisations may not invest the necessary resources to ensure the production of high quality indicators, nor disseminate sufficient documentation of data sources and methods.

8. There is, however, no consensus on what the role of national statistical offices should be with regard to LCS indicators. Should LCS indicators be left to others, or should NSOs take a greater role in the development and production of LCS indicators? Should NSOs be more active in providing data and offering their expertise to other organisations producing LCS indicators?

C. Scope of the Guidelines

9. The scope of the Guidelines is leading, composite and sentiment indicators. The focus is on sentiment and composite indicators. Leading indicators are not dealt with as a separate group of indicators but considered a subset of composite and sentiment indicators. Hence, the discussion of composite indicators also covers leading composite indicators and the discussion of sentiment indicators cover leading sentiment indicators.

10. The Guidelines do not deal with individual quantitative indicators that may be interpreted or used as sentiment or leading indicators. For instance, inventory statistics, building permits statistics, car sales statistics or industrial production indices may be used as indicators of business expectations, or as early indicators of the business cycle. The guidelines also do not deal with traditional statistical measures, such as the gross domestic product (GDP) or the consumer price index (CPI). The role of NSOs in their production is well-established and a wealth of international statistical standards and recommendations on their production are available for NSOs to draw upon.

D. Initiatives by the Conference of European Statisticians

11. Due to the growing importance of LCS indicators the Bureau of the Conference of European Statisticians (CES) undertook an in-depth review of leading, composite and sentiment indicators in January 2014 with the aim to discuss the role of official statistics in this context. As a basis for the in-depth review, the UNECE Secretariat carried out a survey on the practices in the area of LCS indicators of NSOs in December 2013 and received replies from 38 CES countries[1]. The survey confirmed different practices and different views on the involvement of NSOs in the production of LCS indicators.

12. The Bureau concluded that exchange of experiences and best practices would help countries, which are producing such indicators, even though work in this area is not a priority for all statistical offices. Development work should be carried out at an international level with the NSOs' involvement to share experiences and avoid duplication of efforts. The Bureau also found that the area lacks international coordination and a systematic approach, that there is a need to achieve a common understanding of the role of statistical offices in this area as well as for guidance for NSOs that produce or consider producing LCS indicators.

13. The CES plenary session in April 2014 confirmed a large interest of NSOs in LCS indicators but also different views on to what extent NSOs should engage in the production of LCS indicators. The Conference concluded that it would be useful to further discuss the

[1] Armenia, Australia, Austria, Azerbaijan, Belarus, Belgium, Bulgaria, Canada, Colombia, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Hungary, Israel, Italy, Japan, Kazakhstan, Latvia, Lithuania, Mexico, Moldova, Mongolia, Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovak Republic, Sweden, Switzerland, Turkey, Ukraine and United Kingdom.

role of official statistics and the challenges in compiling and disseminating LCS indicators and to clarify the responsibilities and boundaries of national statistical offices' roles with regard to LCS indicators.

14. In February 2016 the Bureau agreed to establish a Task Force on Leading, Composite and Sentiment Indicators to develop recommendations of good practices for NSOs for producing LCS indicators. The recommendations should clarify the possible roles of NSOs in producing LCS indicators, suggest criteria for NSOs involvement in the production of LCS indicators and provide guidance for NSOs' production of such indicators. Throughout, the recommendations should take relevant methodological guidelines and handbooks into account, such as those provided by Eurostat, the OECD and UNSD[2]. The recommendations should not duplicate existing material but refer to this when useful and give guidance on how to select between different methods.

E. Purpose of the Guidelines

15. The Guidelines should provide guidance to compilers and managers in NSOs that produce or consider producing composite or sentiment indicators. The guidelines should meet the needs of countries with experience in producing LCS indicators as well as countries that have no or less experience in this area.

16. There are three main objectives of the guidelines:

1. To clarify the role of NSOs and official statistics in producing LCS indicators

17. The Guidelines should clarify the different roles of NSO in producing LCS indicators and give strategic advice on how to meet user demands for LCS indicators while adhering to the principles of official statistics and not risking the trust in NSOs statistics. Identify problems and issues associated with the production of the indicators and discuss the challenges – opportunities and risks – for NSOs in producing LCS indicators. Guidance on the preconditions and limits for NSOs involvement in the compilation of the different types of indicators and on communication should also be provided.

2. Provide strategic and operational guidance to NSOs on producing LCS indicators

18. The Guidelines should give strategic and operational guidance on how to compile and disseminate LCS indicators. To this end, it should include a typology of LCS indicators and recommend steps and methods that can be applied by NSOs, without going into methodological or technical details. Instead, references to existing methodological manuals and handbooks should be provided. The Guidelines should also address quality assurance based on the principles of official statistics for NSOs' production of LCS indicators, highlight risks and pitfalls in the compilation and dissemination and how these may be dealt with, and address issues related to international comparability.

3. To provide examples of good practice to NSOs for producing LCS indicators

19. The Guidelines provide a collection of good practice examples of compilation and dissemination of LCS indicators, which describes data sources, compilation methods and dissemination.

[2] The Handbook on Constructing Composite Indicators (OECD, 2008), Towards a Harmonised Methodology for Statistical Indicators Parts 1-3 (Eurostat, 2014, 2017 and 2017a) and the Handbook on Cyclical Composite Indicators (EU and UNSD, 2017).

F. Overview of the Guidelines

20. The Guidelines are structured in seven chapters and annexes. Each chapter can be read separately, while the reader should be familiar with the main concepts used, which are described in Chapter 3. The guidelines also include national and international good practice examples presented throughout the chapters and in the Annexes.

21. *Chapter 2* discusses the role of NSOs in producing LCS indicators to meet user needs while adhering to the principles of official statistics by providing impartial and relevant information to the society. The chapter discusses the main challenges faced by NSOs and describes different strategies applied by NSOs in relation to producing LCS indicators. It also presents an analysis of possible strengths, weaknesses, opportunities and threats (SWOT) of NSOs producing LCS-indicators.

22. *Chapter 3* presents a typology of LCS indicators. The typology defines and explains the different types of indicators and provides examples of the main indicator types. The typology focuses on sentiment and composite indicators. For both a distinction is made between indicators with a reference series i.e. a series that the indicator aims to estimate, and indicators without reference series. Leading indicators are not dealt with as a separate group of indicators but considered a subset of composite and sentiment indicators.

23. *Chapter 4* presents sentiment indicators. The chapter deals mainly with single economic and single socio-economic sentiment indicators. The chapter provides information on the background, compilation procedures, usage, pros and cons and analysis of sentiment indicators. Issues related to international comparability are also addressed in this chapter.

24. *Chapter 5* provides an overview of economic composite indicators. This chapter presents the most commonly used models for composite economic indicators and provide guidance on their compilation. It highlights advantages and disadvantages/risks of composite economic indicators and issues and pitfalls NSOs should be aware of when constructing these. A distinction is made between *cyclical indicators* and *structural indicators*. The chapter presents in a condensed form the steps involved in the production of a cyclical composite economic indicator based on the OECD (2008) Handbook for constructing composite indicators and the EU/UNSD (2017) Handbook on Cyclical Composite Indicators.

25. *Chapter 6* focuses on Composite socio-economic indicators. It provides some background on socio-economic composite indicators and highlights their difference to economic composite indicators treated in Chapter 5. Furthermore, it presents the main steps for constructing a composite socio-economic indicator: setting-up the conceptual model of the indicator; selection of dimensions and indicators; data treatment; multivariate analysis, normalisation of data, weighting and aggregation; and validation. Aggregating over different dimensions, lack of reference series and lack of a common unit of measurement (as given in monetary units for economic indicators) bring in additional challenges in the construction of socio-economic indicators that are discussed.

26. *Chapter 7* discusses the communicating of LCS indicators, which is considered a strategic factor for success. The chapter lists the specific challenges involved in communicating indicators and gives guidance on how to meet the quality criteria of official statistics when disseminating the indicators. The chapter provides practical examples of good communication of indicators by use of different means of communication and visualization methods.

II. The role of NSOs in producing leading, composite and sentiment indicators

A. Introduction

27. The growing demand and use of leading, composite and sentiment (LCS) indicators raises a number of challenges to national statistical offices (NSO) in terms of their role in the production of such indicators, which involves both opportunities and risks.

28. Historically most LCS indicators have been produced by other organisations than NSOs, including government organisations, research institutes or private bodies, or international organisations. However, today many NSOs have engaged in the production of LCS indicators, or are considering whether to move into this area of statistical indicators.

29. Engaging in the production of LCS indicators is an opportunity to address changing user needs, gain visibility and demonstrate the relevance of official statistics by meeting societies' need for statistics produced according to the principles of official statistics. On the other hand, LCS indicators may be considered to fall outside what NSOs should be producing. Measuring subjective or complex/multi-dimensional phenomena may not be seen as in line with the role of official statistics, and there is a concern that engaging in the production of such indicators could harm the trustworthiness of the NSO.

30. To respond to the demand for LCS indicators, NSOs therefore need to consider the opportunities and risks of engaging in the production of LCS indicators in line with the requirements of impartiality and quality of official statistics.

B. Growing and changing user needs

Over the last decades user needs have evolved quickly reflecting technological and economic developments. In many areas such as well-being, IT-investments, business cycle indicators, environment and sustainable development policy makers and societies have demanded more and timelier data and new types of statistics.

1. Socio-economic sentiment indicators

31. The Stiglitz-Sen-Fitoussi Commission on the measurement of economic performance and social progress looked beyond the traditional GDP measure and suggested areas where more statistical information is needed. The report concluded, among other things, that many aspects of well-being remain difficult or impossible to measure in monetary units and greater importance should be given to develop qualitative and multi-dimensional measures of well-being. Some of these non-monetary indicators are objective but the report also recommends the use of subjective indicators. The Commission listed the following dimensions of well-being and quality of life that should be taken into account: material living conditions (income, consumption, and wealth), health, education, personal activities (including work), political voice, social connections and relationships, environmental conditions and physical and economic security.

32. The work of the Stiglitz-Sen-Fitoussi Commission was followed by an increased interest in measuring well-being, satisfaction with quality of life (including quality of employment), happiness and other 'subjective' areas of life and society that may fall outside what traditionally has been considered in scope of many statistical offices. This, in turn, increased the demand for composite socio-economic indicators covering different dimensions and measures of subjective well-being and triggered comprehensive research of new and more appropriate socio-economic indicators.

2. Economic sentiment indicators

33. Business and consumer tendency surveys and resulting confidence indicators have emerged since the 1960's. In the 70's the EU established standard frameworks which the OECD adapted in the 1990's and currently assist Asian and Latin American countries in adopting. The economic crisis in 2008-2009 revealed a lack in economic statistics regarding data that describes such developments in a better and timelier way, taking the growing complexity in the financial markets and the intertwined relations between real and financial economies into account. As a result of the economic crisis a considerable amount of research have been devoted to further developing business cycle indicators, indicators intended to forecast economic turning points and consumer confidence indicators.

34. Obviously, societies will continue to change as will the demands from users of official statistics. Evidence-based decision making will increase the demand for coherent and relevant statistics at a national level. At the same time, continuing globalisation will increase the importance of the statistics being internationally comparable in order to perform comparisons between countries and regions.

C. Pros and cons of LCS indicators

35. Leading, composite and sentiment (LCS) indicators cover a broad group of statistical measures, which in different ways aims to provide information about the society and its individuals. The main pros and cons of the different types of indicators are summarised below.

1. Composite indicators

Pros	Cons
• Can summarize complex, multi-dimensional realities • Are easier to interpret than a battery of many separate indicators • Facilitate communication with general public and promote accountability • Suitable to bring issues on the policy agenda • Help to construct/underpin narratives for lay and literate audiences • Enable users to compare complex dimensions effectively • Can be used to assess developments over time and for evaluating country performance	• May send misleading information • Invite to simplistic conclusions • Use of weighting that could be subject of political disputes • May disguise serious failings in some dimensions and increase the difficulty of identifying proper remedial action, if the construction process is not transparent • Lack of internationally agreed practices

Source: OECD (2008), pp 13-14

2. Leading indicators

Pros	Cons
• Can be used to give early warnings of changes in the business cycle • Can be used for forecasting possible turning points and recession/expansion phases	• May prove to provide poor predictions/forecasts • May not over time maintain its leading quality compared to a given reference series • Underlying methodology may be questioned

3. Sentiment indicators

Pros	Cons
• Can provide information of sentiment/subjective issues not elsewhere available • Timely and present, which may be published in advance of any corresponding *quantitative* statistics • Simple in its messages, well-suited for communication	• May be criticized for being subjective, and not reflecting reality • Production and communication of the indicators may challenge the traditions and practices of the NSO

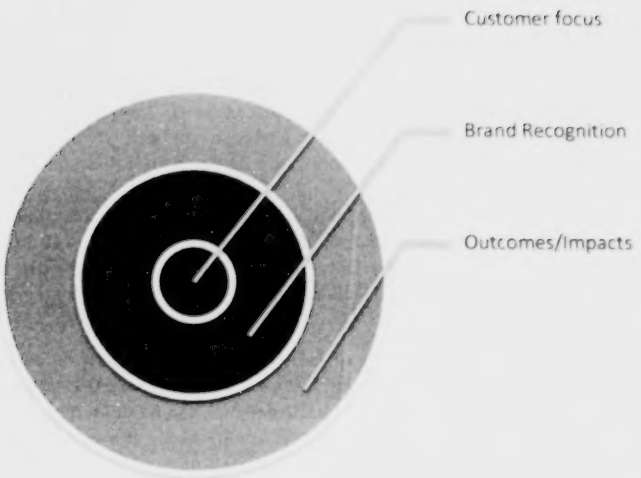
D. The role of official statistics

36. Producing official statistics to meet societies' needs for relevant, independent and reliable statistical information is a key purpose of NSOs. According to the Fundamental Principles of Official Statistics, official statistics should provide relevant and impartial statistics to be made available to the citizens. NSOs need to continuously develop their statistics to reflect the changes in society and stay relevant. As societies are changing, NSOs have to develop and refine statistics to meet the changing user needs.

37. Figure 1 illustrates three key dimensions of the value of official statistics. *Customer focus* is in the centre, underlining the responsibility of NSOs to meet society's need for relevant and impartial information. *Brand recognition* means that statistics produced by NSOs (or others) according to the principles of official statistics is being recognized as impartial and reliable and of high quality. The *outcomes impacts* dimension refers to the use of official statistics. The value added of official statistics increases with increasing use of the data. Hence, user needs should be in focus of the NSOs' planning and production of statistics.

38. However, the principles of official statistics do not spell out in detail what to be considered as official statistics, or how official statistics in detail should be compiled or published. Also, the borderline of official statistics is not static. As societies change, NSOs need to review and eventually change the way in which statistics is produced and develop new statistics to remain relevant, while adhering to the principles of official statistics.

Figure 1
The dimensions of the value of official statistics



Source: Recommendations on the value of official statistics. Note by the Task Force on the value of official statistics, presented to the CES Bureau meeting in February 2017.

39. Recent examples include, e.g. the frameworks to compile sustainable development indicators and for measuring quality of employment, areas in which NSOs have engaged by producing statistics only recently[5]. The development of the System of Environmental-Economic Accounting is another example of a framework that allows NSOs to engage in the production of statistics which earlier were not undertaken by NSOs.

40. Looking at LCS indicators in terms of the above-mentioned dimensions of the value of official statistics, the starting point would be an assessment of whether there is a need for statistics of this type. The NSO would need to evaluate priorities, available resources and cost/benefits of engaging in the production of LCS indicators.

41. Secondly, if the NSO decides to produce a LCS indicator, it should ensure that the indicator is produced meeting the quality criteria of the statistical office and that the indicator is considered of high reliability and quality by users to live up to the brand of official statistics. The outcomes/impacts of producing LCS will depend on the use of the indicators.

E. Cooperation with stakeholders and users

42. It is useful to recall two functions that indicators may have. Firstly, the informative function, when indicators are communicated to inform about different phenomena. Secondly, indicators may also have a social function. This is the case when indicators are used to assess the development or the performance in a given area. This allows different social groups or the public in general to participate in the discussions and the decisions in society on a better informed base.

[5] UNECE (2013), Measuring Sustainable Development, and UNECE (2015), Handbook on Measuring Quality of Employment

43. Especially through their social function, indicators "can contribute to the construction of a common definition of the situation and to prior agreement on the facts" for the progress of society. In this way, official statistics assume the role of an important element in the democratic process as referred to in the first of the UN Fundamental Principles of Official Statistics: "Official statistics provide an indispensable element in the information system of a democratic society".

44. Relevance is a core quality of official statistics. To ensure the relevance stakeholders and users should be consulted. Stakeholders and users will have needs and views on e.g. which dimensions should be included in a composite indicator, which questions should enter a sentiment indicator, or which population or population groups should be in scope etc. Furthermore, stakeholders and users may have expert knowledge in the specific area that the indicator aims to cover that the NSO can draw on. Those developing indicators also need to understand how and why indicators are being used, so they can be designed in a form that is understandable to users and meets their needs. Box 1 provides an example of an NSO actively engaging with stakeholders and citizens in the development of composite indicators for well-being.

45. In principle, the development of indicators should be based on a wide consensus reached through a dialogue involving all relevant stakeholders and user groups. Potential groups that could be consulted depend on factors such as (1) the purpose of the indicator; (2) the institutional and political set-up and traditions of the country; (3) the policy priorities of the involved organisations; and (4) the time and resources available for the development of the indicator.

46. For technical topics such as the measurement of economic performance, where a specific expertise is required, the relevant stakeholders could be only policy makers and experts specialised in that domain. For other topics potentially engaging the society at large, such as measuring well-being or sustainable development, a much wider group than the technical experts should be involved. Stakeholders may thus also include citizens and non-governmental organisations representing different segments of society.

47. It is essential to establish an ongoing interaction between data producers and data users. Users, for instance policy makers, user groups or organisations, may assess the relevance of proposed dimensions and indicators for a given purpose, and statisticians can assess the measurability of dimensions and indicators in an iterative process. An ongoing dialogue with users is a key to producing high quality statistics that are also policy relevant, especially as indicators may change as scientific knowledge, policy concerns and data availability progress. It is worth mentioning that when indicators are used for monitoring a specific policy, the definition of the indicators should be kept constant to be able to assess the development over time, e.g. if the situation is moving towards a given kind of target.

48. In summary, communication with stakeholders and users relates to the social function of indicator-based communication, which enables citizens to participate with a better informed opinion in society's decision making. It opens statistics to the democratic process and enables users to have their say on the relevance of the statistical indicators. By being involved in the development of indicator sets, citizens no longer play the role of passive users of statistics but become 'co-creators' of the statists. As a result, they may obtain knowledge allowing them to evaluate societal progress and to develop informed opinion. Interactivity plays a central role both at the early stage of developing the indicators and later at the stage of their dissemination. Advancements in information technology which allow for interactivity can facilitate this approach.

Box 1
Developing well-being indicators in Israel

The Israeli indicator of well-being, sustainability and national resilience

49. In 2012 the Israeli government adopted a resolution to develop indicators on well-being, sustainability and national resilience. The purpose was to have a comprehensible, updated and sound picture of the well-being of Israeli citizens in terms of a set of economic, social and environmental indicators. The indicators should provide information for policy making, whether by the government or other decision makers, and to the public for assessing progress and changes in well-being.

50. The development of the well-being indicators was led by a Steering Committee comprising representatives of the Office of the Prime Minister, the National Economic Council, the Ministry for Environmental Protection, the Ministry of Finance and the Central Bureau of Statistics. The Steering Committee was asked to decide what dimensions to include, appoint work teams for each dimension and present a recommendation to the government on which dimensions and indicators to include. To ensure broad consensus, a thorough consultation with stakeholders and the public in general was carried out. As part of this, online questionnaires were conducted as well as workshops and focus groups to get a feedback from the public. The online questionnaire asked respondents to rank proposed dimensions by their importance to quality of life and to suggest other dimensions that could be included or possible indicators to be used for the dimensions.

51. As a result of the consultation 9 dimensions were selected: 1) quality of employment, 2) personal security, 3) health, 4) housing and infrastructure, 5) education and skills, 6) personal and social well-being, 7) environment, 8) civic engagement and governance, and 9) material standard of living. For each dimension, an expert team was established consisting of representatives of government departments, research institutions, civil society organisations and private sector organisations, to suggest 8 indicators for each dimension and the desired direction of change of each indicator. The work of each team was led by a relevant ministry. E.g. the work on material standard and living was led by the ministry of finance, and the work on education was led by the ministry of education.

52. Based on the proposal by the Steering Committee the Israeli government adopted a resolution in 2015, requesting the Central Bureau of Statistics to publish annually the indicators of well-being, sustainability and national resilience. The indicators were first published in 2016. For the dimensions where it was found meaningful to compile a composite indicator the composite indicator is compiled as the unweighted average of the individual indicators of the dimension. It was also decided to develop two additional dimensions: information technology; and leisure, culture and community. Indicators for these two dimensions have been established and were included in the release of the indicators in March 2017 comprising 11 dimensions.

53. The Publication CBS-IL (2015), 'Well-being, sustainability and national resilience indicators' provides additional information and details. It is available on http://www.cbs.gov.il/statistical/sust161_e.pdf

F. Quality assurance of LCS indicators

54. Different quality assurance frameworks for official statistics exist, such as provided by the UN, the European Statistical System or OECD. The frameworks cover Institutional environment, Statistical processes and Statistical output and list a number of criteria to be met to ensure the quality of the statistical production. The frameworks to some extend diverge and provide different levels of detail, but essentially cover the same criteria

required to ensure that statistics produced are relevant, timely and accurate and comply with the principles of professional independence, impartiality and objectivity.

55. While the production of LCS indicators should meet all criteria of official statistics the following criteria are particularly important to consider for the production of LCS indicators:

Institutional environment, Statistical processes

- Professional independence;
- Impartiality and objectivity;
- Methodological soundness.

Statistical output

- Relevance;
- Accuracy and reliability;
- Coherence and comparability;
- Accessibility and clarity;
- Timeliness and punctuality.

1. Institutional environment, Statistical processes

56. Professional independence, impartiality and objectivity, and methodological soundness refer to the institutional environment and the statistical processes. In brief, these criteria can be summarised as follow:

57. *Professional independence* implies that statistics should be developed and produced without interference or pressure from other government agencies, policy makers, or the private sector. This is required to ensure the credibility of official statistics. Developing LCS indicators may involve engaging with stakeholders, including government agencies, policy makers and organisations. Such cooperation should be transparent and organised to ensure proper roles for all involved groups.

58. *Impartiality and objectivity* imply that statistics should be produced on an objective basis determined solely by statistical considerations. Sources, concepts, methods, processes and data dissemination should be chosen based on statistical considerations and national and international principles and best practices.

59. *Methodological soundness*. This criterion means that statistics should be produced based on sound statistical methods and according to internationally agreed standards, guidelines or best practices. Methods involved in the production of LCS indicators may not be familiar to the NSO and may be questioned or criticised for being based on value judgements. Hence, before engaging in their production, NSOs need to carefully consider and examine possible compilation methods and ensure that the indicators can be produced on sound methodological basis without jeopardizing the trust in official statistics or questioning the impartiality of the NSO. To this end, data sources and methods should be fully documented and made available to users to ensure transparency.

60. To the extent possible, indicators and their component series should align with the scope and definitions of other statistics. For indicators with a reference series scope and definitions should follow those of the reference series. For indicators without reference series, for example a composite indicator on well-being or a single sentiment indicator on households' perception of security or their economic situation, there is no measured statistics to target.

61. However, the quality of component series, including their scope, is transmitted to the composite indicators. Therefore, to the extent possible, component series should be in line with agreed scope and definitions in the areas they are intended to cover. Components

series may often come from other official statistics, in which case they should follow agreed definitions. When this is not the case, as with component series from other organisations that do not follow agreed definitions, differences in e.g. scope and definitions should be considered before introducing the component series in the composite indicator. Using component series that are in line with existing definitions will improve the quality of the composite indicator and facilitate comparison with other related statistical series, also when there are no reference series.

62. It is recommended to refer to available international methodological guidelines, such as provided by Eurostat, OECD and the UN.

2. Statistical Output

63. Statistical output should meet the following quality criteria:

64. *Relevance*, which reflects the degree to which the statistics meets user needs. The statistical agency's challenge is to assess and balance the conflicting needs of current and potential users in order to produce statistics that satisfy the most important needs within given resource constraints.

65. *Accuracy and reliability*. Statistics should accurately and reliably portray reality. The accuracy of statistical information reflects the degree to which the information correctly describes the phenomena it was designed to measure. Reliability concerns whether the statistics measure the reality that they are designed to represent consistently over time.

66. *Coherence and comparability* imply that statistics are consistent internally and over time and comparable over statistical domains and geographical areas. This also implies that the statistics should be produced using common standards with respect to scope, definitions, classifications and units.

67. *Accessibility and clarity*. Statistics should be made available in a clear and understandable form, accessible to all users in suitable and convenient formats. Documentation and supplementary explanation, which are necessary for the proper understanding and use of the statistics should be made publicly available.

68. *Timeliness and punctuality*. Timeliness refers to how fast after the reference period data are released. Punctuality refers to whether data are released on the expected, preannounced dates. LCS indicators should be released according to international recommendations on timeliness and punctuality, and be in line with the release of other official statistics. The added value of leading indicators derives from being timelier than the statistics whose movement they aim to anticipate, e.g. by providing an idea about the macroeconomic development before the established statistics is released.

3. Experimental statistics

69. When developing LCS indicators it may be the case that not all quality criteria can be met or the statistical office may feel uncertain if the indicator is suitable to be published. In such cases statistical offices have the possibility to publish the indicator as experimental statistics, with a clear distinction from other official products. This would allow the statistical office to gain experiences and collect feedback from users and stakeholders without putting the impartiality or the professional reputation at risk.

G. Challenges and strategies

70. Many NSOs are already involved in producing LCS indicators or are considering whether to produce such indicators to meet user needs. Several NSOs have good experience

in producing LCS indicators and have found that the statistical expertise and impartiality of the NSO places them in a strong position for compiling and disseminating such indicators. Compiling and disseminating LCS is seen as an opportunity for NSOs to demonstrate the relevance and value of official statistics and an opportunity to reach out to new user groups and gain visibility.

71. Other countries do not see LCS indicators as a priority area, or they find that LCS indicators are out of scope of what the NSO should produce. The methods involved in their production may not be considered in line with the principles of official statistics since they may involve value judgements or subjectivity in the selection of data sources and methods, and the quality of the indicators may not meet the quality standards for official statistics. There is also a concern that producing LCS could harm the general trust and reputation of the NSO and compromise its role as the provider of impartial statistical information based strictly on professional considerations. Being a new area for many NSOs, the dissemination of LCS may also constitute a risk, including on how to react on misuse or misunderstandings or explain unexpected developments of the indicators. NSOs refraining from or hesitating towards producing LCS indicators may consider entering cooperation with external statistical agencies.

1. Policy challenges of producing LCS indicators

72. The development and the production of an LCS indicator would involve a number of steps similar to those that would be used when developing other statistics, as illustrated in Figure 2 below.

Figure 2
Steps in developing an LCS indicator

73. As mentioned earlier, the first step when developing new statistics is to identify user needs, which may involve consultation with users and stakeholders. Once the needs are identified, it is crucial to develop a sound conceptual model to serve as a framework or reference frame on which to base the compilation of the indicator. Based on the conceptual model the statistical model should be established. The statistical model would define the indicator series and all component series and the involved calculation steps to get from the component series to the indicator, including procedures for aggregation and weighting and any treatment of data series (i.e. normalisation, smoothing or other manipulations). To the extent possible the statistical model should be tested and validated using available data series to ensure it has the intended properties. This step may also involve consultation with users, stakeholders or experts with particular knowledge. After careful validation, the statistics should be released and communicated to the users with appropriate documentation and explanations. Obviously, there may be feedback from the users that should be considered and which eventually could lead to changes in the way the indicator is being produced.

74. While the development of LCS indicators to some extent follow the same steps as many other official statistics, LCS indicators nevertheless challenge the borderline of what type of statistics should be produced by NSOs. Depending on the type of indicator, their production may question existing policy and practices in different ways.

(a) Leading indicators

75. Many NSOs restrict their statistics to cover only historical periods for which data can be obtained, and are not involved in producing forecasts or predictions of what may happen in the future. There may be a 'division of labour' according to which the NSO produces historical data, while it is left to the users of the statistics to produce forecasts or estimates of future developments. However, the limit is not clear.

76. While many NSOs already produce model based statistics such as nowcasts, flash estimates or early indicators, NSOs in general refrain from compiling or disseminating forecasts, even if the borderline between these may not always be very clear, for instance they may rely on similar statistical models or techniques.

(b) Composite indicators

77. Compiling composite indicators involves the selection of individual component series and weighting these together to one composite measure. The composite indicator may include several different dimensions, which also will have to be selected and weighted together. For example, a composite index of well-being may include dimensions such as income, health, employment, housing, personal/family relations and more. Assigning weights to the component series and the dimensions may be seen as difficult or subjective, and beyond the role of official statistics. Some international methodological guidelines are available, notably the Handbook on Constructing Composite Indicators (OECD, 2008) and the Handbook on Cyclical Composite Indicators (EU and UNSD, 2017). However, no commonly agreed practices in statistical offices have been developed.

(c) Sentiment indicators

78. Sentiment indicators are sometimes viewed as dubious and of inferior quality compared to traditional *quantitative* statistics. Hence, producing sentiment indicators may be seen as outside the scope of what the NSO should be engaged in, and e.g. not in line with producing *quantitative* or "objective" statistics. There is a distinction between relatively simple and well-established sentiment indicators and more complex sentiment indicators such as requested by Stiglitz, Sen and Fitoussi (2009). Simple sentiment indicators are produced by many statistical offices based on business or household surveys that include questions on whether the respondent expects production to develop in the next period, or households' plans for their future consumption etc. More complex sentiment indicators that aim to measure different aspects of quality of life or wellbeing are rarer. These require a theoretical and statistical framework to be developed and may involve different dimensions in which case both dimensions and individual indicators of the dimensions will have to be selected and aggregated. These may also be more difficult to communicate to the users and the public in general and may be subject to discussion and criticism.

2. Strategic challenges

79. The growing demand for LCS indicators poses strategic challenges to NSOs in terms of both opportunities and risks. On the one hand, engaging in the production of LCS indicators is an opportunity to produce such indicators according to the principles of official statistics, meeting user needs, reaching out to new user group and demonstrate the relevance of official statistics. Producing LCS indicators may also be a first step in developing standardized indicators aimed to measure such phenomena as the Sustainable Development Goals (SDG) or Beyond GDP/Quality-of-life concepts, as they can be adapted for specific purposes. If what matters is not measured, there is a risk that official statistics will lose visibility and may become marginalized. In addition, not engaging in the production of LCS indicators does not imply that these are not produced by others, but they may be produced in a less standardized way and not adhering to the principles of official

statistics, and hence may be of poorer quality. It may also be argued that NSOs should engage in the production of LCS indicators from a cost-benefit point of view, since NSOs would have the statistical infrastructure required for and easy access to statistical series that could feed into the production of the indicators.

80. On the other hand, broadening the scope of official statistics to areas that have traditionally been considered outside the competence of NSOs can be a risk. Measuring subjective or complex/multi-dimensional phenomena may be controversial and seen as non-compatible with objectivity and impartiality, and could reduce trust in official statistics. The main strategic challenges that come with the demand for LCS indicators may be summarized as follows:

- Should the NSO engage in the production of LCS indicators, or leave this to others? And what are the opportunities and the risks of engaging or not engaging?
- If the NSO decides to engage in production of LCS indicators, how should the compilation and the dissemination be organized within the quality framework of official statistics?
- What role could the NSO play in relation to other organisations producing LCS indicators, e.g. in terms of providing data input and methodological expertise?
- How to continue work towards developing and harmonising the production of LCS-indicators as part of official statistics?

Based on practices in different countries three main strategies can be identified:

(a) The proactive strategy

81. NSOs with a proactive strategy are already producing LCSs, and are not waiting for international guidelines or recommendations. Focus in this strategy is to meet user needs and being visible in the realm of data being published by other institutions than the NSO. The strategy presumes availability of methodological expertise (or this needs to be developed) and involves some degree of learning-by-doing. It is also necessary to develop dissemination and communication practices. Advantages include gaining early experiences and reaching out to new user groups. On the disadvantage side, published data and underlying methods may be questioned and there is a risk that the impartiality and the general trust of the NSO may be harmed. This strategy is relatively resource demanding.

(b) The pending strategy

82. NSOs with a pending strategy consider producing LCS indicators but are in doubt and wait for more international guidelines or recommendations. This group also includes NSOs that produce one or two simple sentiment indicators or a composite index, but would like to do more. The strategy requires less in-house methodological resources than the proactive strategy. It benefits from using methods developed by others and is less resource demanding. The risks of making mistakes, for being criticised or harming the general trust to the NSO should also be reduced, compared to the proactive strategy.

(c) The non-producing or non-involving strategy

83. Some NSOs find that compiling and disseminating LCS would fall outside of what they should do and do not see this as a priority of official statistics. It may also be that the NSO does not feel to have the necessary expertise or, more generally, the resources to allocate to this area. Another possibility is that LCS indicators are produced by other organisations, so there may not be a significant demand for the NSO to move into the area. While a safe strategy, abstaining from producing any LCS indicators may lead to loss of visibility and failing to address changed user needs.

3. Strategic partnerships – providing data and statistical expertise to other producers of indicators

84. The limited resources of official statistics and the increasing availability of 'non-official' data (e.g. big data) suggest that official statistics will not be the only source of information. There is therefor also the possibility that the NSO engage as provider of input data or statistical expertise to other producers of LCSs. This could also involve e.g. quality control for third-party data, which could result in development of more trusted data. Box 2. gives an example of a strategic partnership between Statistics Sweden and the Swedish National Research institute.

85. The strategies are not static. An NSO can have different strategies for different types of LCS indicators, and the strategy for a particular type of indicator may change over time and depending on the relevance of the indicator and the users' request for it.

Box 2
Strategic partnerships of Statistics Sweden

Most official statistics in Sweden is produced by Statistics Sweden. Official statistics not produced by Statistics Sweden is produced by other agencies adhering to the principles of official statistics, with whom Statistics Sweden cooperates. One example is the ***Business Cycle Barometer for Sweden***, which is a composite sentiment indicator produced by the National Research Institute. The indicator is part of official statistics, and Statistics Sweden provides statistical and methodological support and advice to the National Research Institute on the production of the indicators, including on the weighting of component series etc.

Source: The Swedish national research institute

H. Strengths, weaknesses, opportunities and threats

86. This section considers possible strengths, weaknesses, opportunities and threats for NSOs engaging in producing LCS indicators. Strengths and weaknesses are considered to catch factors that are internal to the organisation, while opportunities and threats generally relate to external factors.

87. Strengths include advantages of NSOs compared to other organisations in the production of LCS indicators. What puts the NSO in a better position than other organisations in terms of knowledge, IT, economic, legal or other factors. It also includes what the public would consider a strength of the organisation.

88. Weaknesses are considered to cover internal factors that may prevent the organisation from engaging in the production of LCS indicators, or make this difficult. Weaknesses may also be limitations, such as e.g. the need for NSOs to compile statistics according to the principles of official statistics, which on the other hand also presents a strength of NSOs.

89. Opportunities may come from changes in demand and in technologies, or changes in government policy related to official statistics. When assessing opportunities, it is useful to look at the organisation's strengths and ask whether these open up any opportunities. Alternatively, one may look at the weaknesses and ask whether eliminating these would open opportunities.

90. Threats include external factors which one way or the other provide risks or obstacles to the NSO. This could include activities of competitors or budget restrictions, or technological development, for instance.

91. The boxes below only cover what could be of general concern to all or most NSOs. NSOs may conduct their own SWOT, or similar analysis, taking more detailed and country specific factors into account.

Strengths	Weaknesses
- The brand of official statistics and the general trusts in NSOs as providers of impartial and high-quality statistics - The global network of recommendations and statistical competences that NSOs can draw on - Statistical and methodological expertise - Wide knowledge of and access to data sources - Efficient production by drawing on existing infrastructure and in-house data sources - Experiences in communicating statistical information - The use of existing tools and platforms for dissemination	- Possible conflicts with the role or the priorities of the NSO or limitations by national legislation - Lack of internationally agreed good practices on producing LCS indicators to lean on - LCS indicators may not live up to the existing quality standards of the NSO - Lack of resources to develop or regularly compile and communicate LCS indicators, which may require new methods and competences - Necessity to implement a suitable quality assuring programme

Opportunities	Threats
- Demonstrate the relevance and value of official statistics by producing needed LCS indicators - Meet emerging user needs, reach out to new user groups and gain visibility, while ensuring compliance with the principles of official statistics - Increase trust in the indicators and facilitate broader usage of these as tools for policy making and business decisions - Increased relevance of official statistics already produced, as input into LCS indicators - Opportunity to engage in or strengthen partnerships with other producers of LCS indicators - Increase expertise by using new IT-tools and new data sources	- Possible criticism of the NSO and reduced trust in official statistics if the LCS indicator is seen as non-compatible with the role of the NSO - Poor performance of LCS indicators may lead to criticism of methods and statistical professionalism - Possible higher risks for misinterpretation or misuse compared to other, well-established statistical series - Influence from outside the NSO on the production of LCS indicators could be a serious threat to the quality of the indicators and the general trust in the NSO - Lack of resources and budget constraints